A NEW SUBSPECIES OF *CANDALIDES HYACINTHINUS* (SEMPER) (LEPIDOPTERA: LYCAENIDAE) FROM WESTERN AUSTRALIA

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Abstract

Candalides hyacinthinus gilesi subsp. nov. is described from south-western Western Australia. The distribution, conservation status and information on the early life history of this new subspecies are recorded.

Introduction

For many years specimens resembling *Candalides hyacinthinus* (Semper) have been collected from the south-west of Western Australia. Following the treatment of Edwards and Kerr (1978), these had been referred to *C. h. hyacinthinus*. Subsequently, more extensive collections have revealed a suite of consistent differences between these specimens and typical *C. h. hyacinthinus* from eastern Australia. These differences warrant subspecific status for the Western Australian specimens.

Candalides hyacinthinus gilesi subsp. nov.

(Figs 1-4)

Types. Holotype ♂, WESTERN AUSTRALIA: Yalgorup NP, 17.xii.1992, M.R. Williams (in Western Australian Museum). *Paratypes*: 6 ♂, 2 ♀, Myalup, [H.H. Bollam], 2.xii.[19]90 (2♂), 21.xi.[19]91 (1♀), 26.xi.[19]91 (4♂), 29.xi.[19]91 (1♀); 3 ♀, L[ake] Preston, [H. Bollam], 25.xi.[19]85, 29.xi.[19]85, 16.xi.[19]87 (all in H.H. Bollam collection); 19 ♂, 11 ♀, Myalup, R. H[ay], 25.xi.[19]85 (1♂), 29.xi.[19]85 (1♂, 1♀), 17.xi.[19]87 (1♂), 25.xi.[19]87 (4♂, 2♀), 28.xi.[19]89 (2♂, 1♀), 2.xii.[19]90 (2♂, 2♀), 26.xi.[19]91 (3♂, 5♀), 1.xii.[19]92 (2♂), 17.xii.[19]92 (3♂); 5 ♂, 4 ♀, Manjedal, RH, 31.xii.[19]93 (all in R.W. Hay collection); 1 ♂, 2 ♀, Myalup, 1.xii.1990, M.R. Williams; 11 ♂, 2 ♀, Yalgorup NP, M.R. Williams, 26.xi.1991 (8♂, 2♀), 17.xii.1992 (3♂); 3 ♀, Manjedal Brook, 8.i.1993, M.R. Williams; 1 ♀, Manjedal Camp, 31.xii.1993, M.R. Williams (all in CALM collection, Kensington); 2 ♂, Windy Harbour, low dense coastal heath above cliffs, 34°50'13"S, 116°00'49"E, 28.x.1995, A.A.E. Williams; 1 ♂, 1 ♀, East of Yallingup, low open understorey in mixed jarrah/sheoak woodland, 30.xii.1995, A.A.E. Williams; 1 ♂, 2 ♀, Cosy Corner near Margaret River, dense mixed heathland on small hill adjacent to eucalypt woodland, 30.xii.1995, A.A.E. Williams; 5 ♂, 2 ♀, Manjedal Brook, Manjedal, Marri and jarrah forest, active around *Cassytha* sp, 4.i.1994, A.A.E. Williams; 5 ♂, 1 ♀, Yalgorup NP, M.R. Williams, 26.xi.1991 (1♂, 1♀), 17.xii.1992 (4♂); 1 ♀, Manjedal Brook, 8.i.1993, M.R. Williams (all in CALM collection, Woodvale).

Description. Male (Figs 1, 3). Head dark grey-brown; antennae black with white bands more prominent beneath; labial palpi black above, white beneath with light grey scales; eyes smooth. Thorax black above, light grey beneath; legs grey, suffused with light grey scales, tarsal segments ringed white. Abdomen dark grey-brown, light grey beneath.

Forewing above shining bronzy purplish-brown; apex dark brown; termen and costa narrowly dark brown; cilia dark brown, tipped white except at ends of veins. Forewing beneath grey-brown; a dark grey bar at end of cell; a narrow postmedian line of dark grey-brown dashes extending from R_5 to 1A+2A; subterminal line of dashes extending from R_5 to 1A+2A, that between M_3 and CuA_1 sometimes larger; those between CuA_1 and CuA_2, and CuA_2 and 1A+2A much larger; termen narrowly darker; cilia dark grey tipped white, except at ends of veins. Length of forewing 12-14.5 mm.

Hindwing above shining bronzy purplish-brown; termen narrowly dark brown; inner margin grey-brown and sparsely suffused with silvery hair scales; cilia dark brown tipped with white, except at ends of veins. Hindwing beneath grey-brown; two dark grey dots within cell, inner dot with a similar dot above it between $Sc+R_1$ and $Rs+M_1$, all three dots variably surrounded narrowly by white; median line of dark grey-brown dots and dashes, two at end of cell, one between $Sc+R_1$ and Rs directly above the distal dot in cell, one between CuA_1 and CuA_2, one between CuA_2 and 1A+2A, and one between 1A+2A and inner margin, dots nearest costa and the three nearest the inner margin narrowly edged by white; postmedian line of dark grey-brown dashes extending from $Sc+R_1$ to inner margin, bowed sharply inwards, those nearest costa and inner margin displaced proximally; subterminal line of black dashes, those between CuA_2 and $Sc+R_1$ bowed sharply inwards between veins, that nearest costa displaced proximally; terminal line of dark grey-brown dots; termen narrowly black; cilia dark grey-brown tipped white except at ends of veins; basal area sparsely suffused with silvery hair scales.

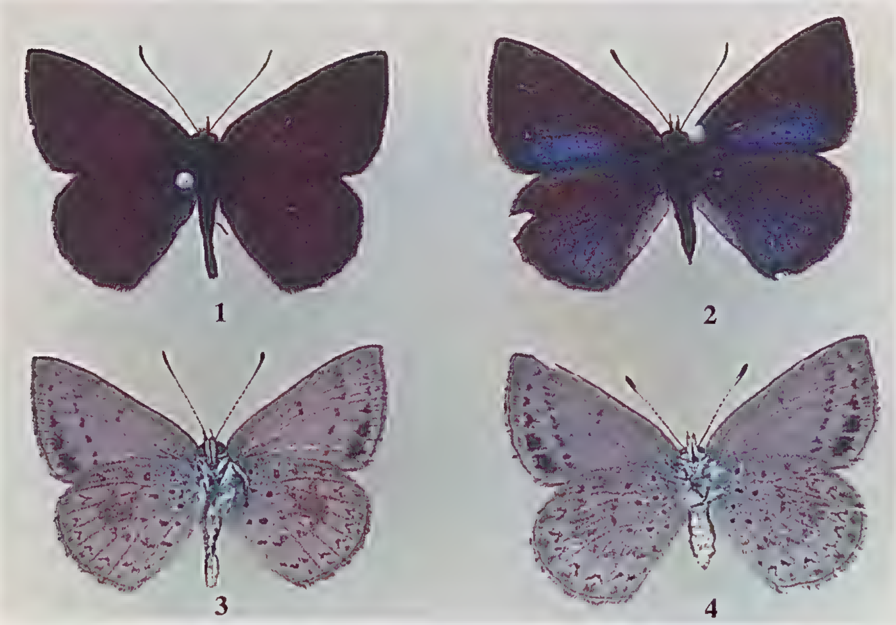
Genitalia with the spicule on the vesica usually shorter than in *C. h. hyacinthinus* (Edwards and Kerr 1978).

Female (Figs 2, 4). Head, thorax and abdomen as in male. Forewing above dark brown, shining purple between CuA_2 and inner margin except for terminal band and on veins, colour sometimes extending into cell and between CuA_2 and CuA_1, scattered blue scales at base. Forewing beneath as in male. Hindwing above dark brown, shining purple between M_1 and 1A+2A except for broad terminal band and on veins; basal half sparsely suffused with long silvery hair scales. Hindwing beneath as in male. Length of forewing 14-15 mm.

Etymology. The subspecific epithet commemorates Henry Murray Giles (*ca* 1857-1935), who collected the first known specimen of *C. h. gilesi* at Smiths Mill (now Glen Forrest), early this century.

Distribution. Specimens have been taken from south-western Western Australia, south of Perth, at the Porongurup Range, Manjimup, Warren River 6 miles (10 km) south east of Pemberton, Windy Harbour, Augusta,Karridale, Cosy Corner, Margaret River, near Yallingup, Glen Forrest (30 km east of Perth) (Edwards and Kerr 1978), Myalup (Dunn and Dunn 1991, Williams *et* *al.* 1993), Dunsborough, Nornalup (Morton 1984), Manjedal Camp (Williams *et al.* 1993) and West Cape Howe (Williams *et al.* 1997).

Comments. C. h. gilesi may be distinguished from *C. h. hyacinthinus* by the following characters: Forewing shape: *C. h. gilesi* is characterized by a more acute apex to the forewing, a feature common to both sexes but particularly noticeable in females. Colour: males of *C. h. gilesi* have a more bronze cast to the wings above and the undersides of both sexes are darker brown. Narrower margin in males: the coloured areas above are more extensive in *C. h. gilesi* males, with a correspondingly narrower margin. Size: Tite (1963) gave the following ranges for forewing length for *C. h. hyacinthinus* (based on specimens from eastern Australia): males 14-17 mm, females 15-17 mm. Specimens of *C. h. gilesi* are typically smaller and we have seen no specimens of either sex with a forewing length greater than 15 mm. Postmedian line of dashes: this is roughly linear in *C. h. hyacinthinus*, but less so and more variable in *C. h. gilesi*.



Figs 1-4. *Candalides hyacinthinus gilesi* subsp. nov. (1) Upperside holotype male; (2) upperside paratype female; (3) underside paratype male; (4) underside paratype female.

Life History

Food plant. At Myalup and at Manjedal Brook the adults fly around *Cassytha racemosa* Nees (Lauraceae), a twining parasite (Marchant *et al.* 1987). Morton (1984) noted that at Nornalup and Dunsborough adults flew around an unspecified species of *Cassytha*. Specimens have been collected from October (Edwards and Kerr 1978) to late January although, based on our experience and the condition of specimens examined, the main flight period is late November to early January. This is the time of year when *C. racemosa* commences flowering. In December 1992 a female was observed ovipositing on the flower buds of *C. racemosa* and a first instar larva was collected from the same plant. This larva was reared to second instar on flower buds of *C. racemosa*. Two females caged with *C. racemosa* oviposited on the flower buds.

Egg. White, hemispherical but flattened, with micropylar region slightly depressed. As in other *Candalides* Hübner species, the egg is covered with a coarsely reticulate pattern of ridges, each with usually five or six sides. Diameter 0.6 mm.

First instar larva. Grey green, each body segment with two pairs of dorsal hairs and laterally fringed with three hairs, 0.25, 0.20 and 0.08 mm long. Each dorsal pair consists of a long clear recurved hair 0.35 ± 0.05 mm long and a clear, straight hair 0.10 mm long, oriented posteriorly. Prothoracic plate grey, almost semicircular. Anal plate grey, pear shaped. The body, prothoracic and anal plates are covered with minute brown spots. Length (excluding setae) 1.0 mm.

Second instar larva. Yellow green, each body segment with two pairs of dorsal hairs and laterally fringed with hairs. Each dorsal pair consists of a long brown recurved hair 0.45 ± 0.05 mm long and a clear, slightly recurved hair 0.25 ± 0.05 mm long, oriented posteriorly. Prothoracic plate yellow green, diamond shaped. Anal plate green, pear shaped. Abdominal segments 1-6 each with a red dorsal spot. The body, prothoracic and anal plates are covered with minute brown spots and ring-like spots. Length 1.8 mm.

Conservation status

Sites at the Porongurups and Myalup are within Porongurup and Yalgorup National Parks, respectively. The sites at West Cape Howe, Windy Harbour and Cosy Corner are within the West Cape Howe, D'Entrecasteaux and Leeuwin-Naturaliste National Parks respectively. The precise locality of the Nornalup site is unknown, but the Nornalup townsite is surrounded by the Walpole-Nornalup National Park. The Manjedal Camp site is on private property adjacent to State Forest. The precise localities of the sites at Dunsborough, Manjimup, Warren River, Augusta, Karridale, Margaret River and Glen Forrest are unknown. *Cassytha racemosa* is widespread in the south-west and the butterfly inhabits the well-conserved jarrah (and possibly karri [*Eucalyptus diversicolor*]) forests. We consider it likely that many further sites where this butterfly occurs will be found. As no threatening processes have been identified, we recommend that *C. h. gilesi* be considered of Lower Risk (Least Concern).

Discussion

The new subspecies is closely allied to *C. h. hyacinthinus* and a summary of the distribution and taxonomy of this species is relevant to our subsequent discussions. *C. hyacinthinus* is distributed south from Exmouth, Western Australia, across much of southern Australia and as far north as Kuranda, Queensland. Distributional data and maps are given by Common and Waterhouse (1981), Dunn and Dunn (1991) and Braby (2000). Four subspecies have been described: *C. h. hyacinthinus* (Semper, 1879); *C. h. simplex* (Tepper, 1882); *C. h. eugenia* Waterhouse & Lyell, 1914 and *C. h. josephina* Harris, 1952. Dunn and Dunn (1991) and Braby (2000) both commented that the south-western form was a distinct subspecies. Edwards and Kerr (1978) considered *C. h. eugenia* to represent the northern end of a cline. Both Common and Waterhouse (1981) and D'Abrera (1984) noted that some specimens of *C. h. eugenia* were almost indistinguishable from typical *C. h. hyacinthinus*. Dunn and Dunn (1991) considered *C. h. eugenia* synonymous with *C. h. hyacinthinus*. *C. h. josephina* may represent a stable hybrid population between *C. h. hyacinthinus* and *C. h. simplex*, as it occurs only in a very restricted zone of contact between these two subspecies in eastern Victoria (Common and Waterhouse 1981). Although *C. h. hyacinthinus* and *C. h. simplex* are markedly different in upperside wing colouration, the male genitalia of the two subspecies are indistinguishable (Tite 1963). We have therefore restricted our comparisons to between the new subspecies and the two well-defined subspecies *C. h. hyacinthinus* and *C. h. simplex*.

The distributions of *C. h. gilesi* and *C. h. simplex* are generally distinct, although they may be sympatric in the Stirling or Porongurup Ranges and possibly at Margaret River. The Margaret River locality for *C. h. simplex* was reported by Edwards and Kerr (1978) and was based on a pencilled note by Dr A. J. Turner. Although subsequent authors (e.g. Common and Waterhouse 1981, Dunn and Dunn 1991) have generally dismissed this record, it may still be proved correct. Near Perth, specimens of *C. h. gilesi* and *C. h. simplex* have been taken about 40 km apart, at Glen Forrest and Fremantle. However, no specimens of *C. h. simplex* have been collected near Perth for many years. Although it is still possible that the two subspecies may yet be found together in this area, they tend to occupy different habitats, with *C. h. gilesi* being confined to forest or woodland in the north of its range, whereas *C. h. simplex* is typically found in heathland. Thus localities where the two species co-occur may prove to be limited to southern areas where *C. h. gilesi* occurs in heathland.

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